Study Strategy

Exercises 62–70 Students should follow the same general pattern for these exercises: use the fundamental counting principle to solve problems involving consecutive choices.

Internet Reference

Exercise 63 More information about the Goldman Environment Prize can be found at www.goldmanprize.org/prize/about.html

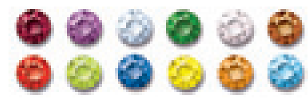
Animated Algebra classzone.com

An **Animated Algebra** activity is available on-line for **Exercise 69**. This activity is also available on the **Power Presentations CD-ROM**.

PROBLEM SOLVING

EXAMPLE 2 A on p. 683 for Exs. 62–63

62. CLASS RINGS You want to purchase a class ring. The ring can be made from 3 different metals. You can choose from 6 different side designs and 12 different stones. How many different class rings are possible? **216 class rings**

Metal	Side Design		Stone
Auralite	Academics	Literature	
Gold	Art	Music	
Silver	Athletics	Technology	

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63. ENVIRONMENT Since 1990, the Goldman Environmental Prize has been awarded annually to 6 grassroots environmentalists, one from each of 6 regions. The regions consist of 52 countries in Africa, 47 in Europe, 45 in Asia, 36 in island nations, 19 in South and Central America, and 3 in North America. How many different sets of 6 countries can be represented by the prize winners in a given year? **225,678,960 sets**

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EXAMPLES 4, 5, and 6 on pp. 684–686 for Exs. 64–66

64. PHOTOGRAPHY A photographer lines up the 15 members of a family in a single line in order to take a photograph. How many different ways can the photographer arrange the family members for the picture? **1,307,674,368,000 ways**

65. SCHOOL CLUBS A Spanish club is electing a president, vice president, and secretary. The club has 9 members who are eligible for these offices. How many different ways can the 3 offices be filled? **504 ways**

66. MUSIC The window of a music store has 8 stands in fixed positions where instruments can be displayed. In how many ways can 3 identical guitars, 2 identical keyboards, and 3 identical violins be displayed? **560 ways**

67a. 240 selections

67b. 252 selections

67c. 60,480 selections

67. MULTI-STEP PROBLEM You are designing an entertainment center. You want to include three audio components and three video components.

a. You want one of each audio component listed at the right. How many selections of audio components are possible?

b. You want one of each video component listed at the right. How many selections of video components are possible?

c. How many selections of all six audio and video components are possible?

Entertainment Center	
Audio Components	**Video Components**
5 receivers	7 TV sets
8 CD players	9 DVD players
6 speakers	4 game systems

68c. Passwords when characters can be repeated; there are more possible choices for these passwords which makes it harder to randomly guess, making them more secure.

68. ★ **EXTENDED RESPONSE** To keep computer files secure, many programs require the user to enter a password. The shortest allowable passwords are typically 6 characters long and can contain both letters and digits. (B)

a. Calculate How many 6-character passwords are possible if characters can be repeated? **2,176,782,336 passwords**

b. Calculate How many 6-character passwords are possible if characters cannot be repeated? **1,402,410,240 passwords**

c. Draw Conclusions Which type of password is more secure? *Explain*.

○ = WORKED-OUT SOLUTIONS on p. WS1   ★ = STANDARDIZED TEST PRACTICE

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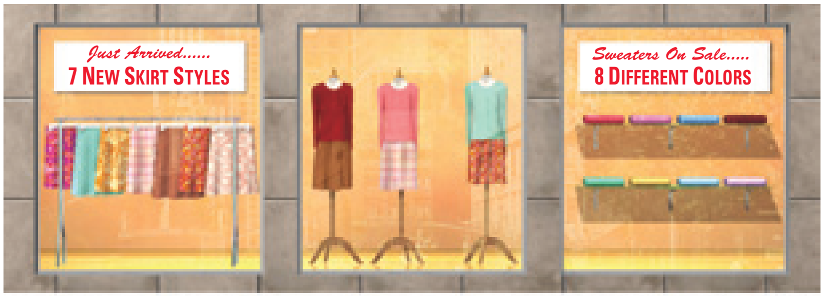
69. CLOTHING DISPLAY An employee at a clothing store is creating a display. The display has 3 different mannequins. Each mannequin is to wear a different sweater and a different skirt. How many different displays can be created? **56 displays**



Animated Algebra at classzone.com

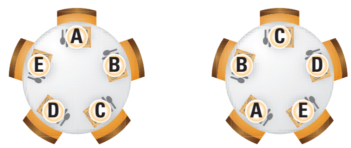
70. CROSS COUNTRY Three schools are competing in a cross country meet. School A has 6 runners, school B has 5 runners, and school C has 4 runners. For scoring purposes, the finishing order of the meet only considers the school of each runner. How many different finishing orders are there for scoring purposes? **6 finishing orders**

71b. $(n-1)!$; since there is no object placed first, second, third, and so on, allow one person to represent a "fixed" position, so the remaining people $(n-1)$, can be arranged $(n-1)!$ ways.

C **71. CHALLENGE** You have learned that $n!$ represents the number of ways that n objects can be placed in a *linear* order, where it matters which object is placed first. Now consider *circular* permutations in which objects are placed in a circle, so that it does *not* matter which object is placed first.

a. Suppose you are seating 5 people at a circular table. How many different ways can you arrange the people around the table? **24 ways**

b. Find a formula for the number of permutations of n objects placed in clockwise order around a circle when only the relative order of the objects matters. *Explain* how you derived your formula.



The two arrangements shown represent the same permutation.

MIXED REVIEW

PREVIEW Prepare for Lesson 10.2 in Exs. 72–77.

Find the product. *(p. 346)*

72. $(x-8)(x+8)$ x^2-64

73. $(4x-5)(4x+5)$ $16x^2-25$

74. $(x+7)^2$ $x^2+14x+49$

75. $(5x-6y)^2$ $25x^2-60xy+36y^2$

76. $(3x-2)^3$ $27x^3-54x^2+36x-8$

77. $(4x+3y)^3$ $64x^3+144x^2y+108xy^2+27y^3$

Find the inverse of the function. *(p. 438)*

78. $f(x)=4x-9$ $y=\frac{x+9}{4}$

79. $f(x)=-x+6$ $y=6-x$

80. $f(x)=4x^5$ $y=\sqrt[5]{\frac{x}{4}}$

81. $f(x)=x^2, x\geq 0$ $y=\sqrt{x}$

82. $f(x)=x^3+5$ $y=\sqrt[3]{x-5}$

83. $f(x)=3x^5-1$ $y=\sqrt[5]{\frac{x+1}{3}}$

Graph the equation. **84–89. See margin.**

84. $y^2=-24x$ *(p. 620)*

85. $x^2+y^2=20$ *(p. 626)*

86. $\frac{x^2}{9}+\frac{y^2}{36}=1$ *(p. 634)*

87. $\frac{x^2}{81}-\frac{y^2}{121}=1$ *(p. 642)*

88. $(x+3)^2+y^2=16$ *(p. 650)*

89. $\frac{(y-1)^2}{16-x^2}=1$ *(p. 650)*

EXTRA PRACTICE for Lesson 10.1, p. 1019 **ONLINE QUIZ** at classzone.com

84–89. See Additional Answers beginning on p. AA1.

5 ASSESS AND RETEACH

Daily Homework Quiz

Transparency Available

1. Find ${}_{11}P_5$. **55,440**

2. Find the number of distinguishable permutations of the letters in BASKETBALL. **453,600**

3. How many different 3-digit IDs can be made if the first digit must be a 7 and no digits may be repeated? **72**

4. How many different ways can a chairperson and an assistant be selected for a research project if there are 7 scientists for the two positions? **42**

Online Quiz

Available at **classzone.com**

Diagnosis/Remediation

- Practice A, B, C in Chapter 10 Resource Book, pp. 6–8
- Study Guide in Chapter 10 Resource Book, pp. 9–10
- Practice Workbook, pp. 149–150
- @HomeTutor

Challenge

Additional challenge is available in the Chapter 10 Resource Book, p. 13.